

AMENDMENTS TO THE CLAIMS

1 (currently amended): A device for monitoring and
controlling the operation of a mechanical press, comprising:

an at least one signal generator;

a signal conditioner operatively connected to said at least one signal generator, for calculating a value from said at least one generated signal, said signal conditioner being configured for relating said calculated value to one of a plurality of severity operating zones;

a display operatively connected to said signal conditioner;
and

a press control unit configured for ~~[[to]]~~ selectably ~~control~~ controlling said mechanical press in accordance with said calculated value in relation to a plurality of severity operating zones, each said severity operating zone defining a relative level of a potential long-term operating reliability ~~[[for]]~~ of said mechanical press, said calculated value being received from said signal conditioner and/or said display.

2 (original): The device of Claim 1, wherein said at least one signal generator is an accelerometer.

AMENDMENTS TO THE CLAIMS

3 (original): The device of Claim 2, wherein said accelerometer monitors press conditions and creates a corresponding signal.

4 (original): The device of Claim 1, wherein said at least one signal generator is attached to the press.

5 (original): The device of Claim 1, wherein said value from said signal conditioner is one selected from the group including: press displacement, press velocity, and press acceleration.

6 (original): The device of Claim 1, wherein said signal conditioner further conditions said calculated value by a peak to peak detector.

7 (original): The device of Claim 1, wherein said signal conditioner further conditions said calculated value with an RMS to DC voltage converter.

8 (original): The device of Claim 1, wherein said display includes a volt meter for displaying said calculated value.

9 (original): The device of Claim 1, wherein said display includes an at least one LED for indicating a vibration severity zone, said vibration severity zone indicating a range for said calculated value.

AMENDMENTS TO THE CLAIMS

10 (original): The device of Claim 9, wherein said vibration severity zone is characterized by one selected from the group including: extreme long-term reliability of the press; very good long-term reliability of the press; reliable conditions under caution; and conditions that are not advisable for long-term reliability.

11 (original): The device of Claim 1, further comprising a switch.

12 (original): The device of Claim 11, wherein said switch allows user selection of said calculated value for said display.

13 (currently amended): The device of Claim 1, wherein said press control unit further comprising a press machine controller for controlling press functions in response to said calculated values from said signal conditioner.

14 (original): The device of Claim 13, wherein said press machine controller includes a programmable logic controller.

15 (original): The device of Claim 13, wherein said press machine controller calculates at least one selected from the group comprising: vibration severity versus time, percent of time within a particular vibration severity zone, total time of press

AMENDMENTS TO THE CLAIMS

operation in a zone, quantity of alarms, time of alarms with respect to operation times, percent of operation time versus non-operation time, and percentage of quantity produced versus time fluctuation and quantity of stops.

16 (original): The device of Claim 1, further comprising an alarm signal generator for signaling undesirable operating conditions.

17 (original): The device of Claim 1, further comprising a data storage device for selectively storing digitized output.

18 (original): The device of Claim 1, further comprising a modem for transmitting said calculated values to a remote location.

19 (currently amended): A device attachable to a mechanical press for measuring press conditions and controlling said mechanical press based on said press conditions, said device comprising:

an at least one accelerometer for measuring press conditions and creating a corresponding signal;

a signal processing means for processing said corresponding signal, said signal processing means connected to said at least

AMENDMENTS TO THE CLAIMS

one accelerometer to process said corresponding signal, said signal processing means comprising:

an acceleration processing means for calculating a press acceleration value;

a velocity processing means for calculating a press velocity value;

a displacement processing means for calculating a press displacement value;

a display means for displaying at least one of said calculated values;

a switch permitting an operator to select one of said calculated values for input to said display means; and

a press control unit configured ~~[[to]]~~ for selectably ~~control~~ controlling said mechanical press in accordance with at least one said calculated value from said signal processing means and/or said display means, said press control unit being configured for relating each said at least one said calculated value to one of a plurality of severity operating zones as a basis ~~[[for]]~~ of control of said mechanical press, each said

AMENDMENTS TO THE CLAIMS

severity operating zone defining a relative level of a potential long-term operating reliability for said mechanical press.

20 (original): The device of Claim 19, wherein said display means further displays a vibration severity zone characteristic.

21 (original): The device of Claim 20, wherein said vibration severity zone characteristic is an LED indicator representing the operating conditions of the press.

22 (original): The device of Claim 20, wherein said vibration severity zone characteristic is one selected from the group including: extreme long-term reliability of the press, very good long-term reliability of the press, reliable conditions provided there is cautious operation, and conditions that are not advisable for long-term reliability.

23 (original): The device of Claim 19, wherein said accelerometer measures press conditions during operation of the press.

24 (currently amended): The device of Claim 19, wherein said press control unit further comprising a press machine controller for controlling press functions in response to said calculated values.

AMENDMENTS TO THE CLAIMS

25 (original): The device of Claim 19, further comprising an alarm signal generator for signaling undesirable press operating conditions.

26 (original): The device of Claim 25, wherein said alarm signal generator generates a signal in at least one method selected from the group including: lighting a light at the press machine, paging a selected individual, forwarding the signal to a remote location, forwarding a prerecorded message to a preselected phone number, and forwarding an electronic message to a remote location.

27 (original): The device of Claim 19, further comprising a data storage device for selectively storing at least one of said calculated values and measured conditions.

28 (original): The device of Claim 19, further comprising a modem for transmitting said calculated values to a remote location.

29 (currently amended): A method of monitoring the long-term reliability of a mechanical press and controlling said mechanical press based on the long-term reliability thereof, comprising:

AMENDMENTS TO THE CLAIMS

generating a unique press vibration severity/reliability zone chart including a plurality of severity operating zones, each said severity operating zone defining a relative level of a potential long-term operating reliability for said mechanical press;

monitoring the vibration severity of said mechanical press;
outputting the monitored vibration severity and the corresponding severity operating zone; and

selectably controlling said mechanical press in accordance with the monitored vibration severity and the corresponding severity operating zone therefor.

30 (currently amended): A system in combination with a press machine and a press machine sensor assembly, said system comprising:

a press machine vibration monitoring apparatus, said press vibration monitoring apparatus being operatively coupled to said press machine sensor assembly, said press machine vibration monitoring apparatus comprising:

AMENDMENTS TO THE CLAIMS

a processor to process sensor signals generated by said
press machine sensor assembly, said processor outputting a
calculated value; and

a press machine controller being operatively coupled to said
processor, said press machine controller being configured [[to]]
for selectably ~~control~~ controlling said press machine, said press
machine controller being configured for relating said calculated
value to a plurality of severity operating zones as a basis of
control of said mechanical press, each said severity operating
zone defining a relative level of a potential long-term operating
reliability [[for]] of said mechanical press.

31 (currently amended): The system as recited in Claim 30,
wherein said press machine controller being configured further to
control said press machine in accordance with processed sensor
signals received from said processor.

32 (original): The system as recited in Claim 30, wherein
said processor being configured to generate relative to said
press machine at least one of an acceleration measurement, a
velocity measurement, and a displacement measurement.

AMENDMENTS TO THE CLAIMS

33 (previously presented): The system as recited in Claim 30, wherein said press machine sensor assembly includes at least one accelerometer.

34 (original): The system as recited in Claim 30, further includes a display operatively coupled to said processor.

35 (previously presented): The system as recited in Claim 30, wherein said press machine vibration monitoring apparatus defining a built-in element of said press machine.

36 (currently amended): An apparatus in combination with a press machine and a press machine sensor assembly, said apparatus comprising:

a press machine vibration measurement device operatively coupled to said press machine sensor assembly, said press machine vibration measurement device being configured for generating a measurement value; and

a press machine controller operatively coupled to said press machine vibration measurement device, said press machine controller being configured for relating said measurement value to one of a plurality of severity operating zones as a basis [[for]] of control of said mechanical press, each said severity

AMENDMENTS TO THE CLAIMS

operating zone defining a relative level of a potential long-term operating reliability ~~[[for]]~~ of said mechanical press.

37 (previously presented): The apparatus as recited in Claim 36, wherein said press machine vibration measurement device further comprises a press acceleration determination unit, a press velocity determination unit, and/or a press displacement determination unit.

38 (original): The apparatus as recited in Claim 36, further comprises:

a display operatively coupled to said press machine vibration measurement device and/or said press machine controller.

39 (original): The apparatus as recited in Claim 36, wherein said apparatus having a built-in configuration relative to said press machine.

40 (currently amended): A method in combination with a press machine, said method comprising the steps of:

sensing and measuring vibration activity in said press machine; and

selectably and operably controlling said press machine ~~operation~~ in accordance with the vibration activity measurement, the vibration activity measurement being related to one of a

AMENDMENTS TO THE CLAIMS

plurality of severity operating zones as a basis ~~[[for]]~~ of control of said mechanical press, each said severity operating zone defining a relative level of a potential long-term operating reliability ~~[[for]]~~ of said mechanical press.

41 (original): The method as recited in Claim 40, further comprises the step of:

providing a built-in press machine vibration monitoring device configured to perform the vibration activity measurement and/or the press machine operation control.

42 (original): The method as recited in Claim 40, further comprises the step of:

displaying the vibration activity measurement and/or a representation thereof.

43 (original): The method as recited in Claim 40, further comprises the step of:

performing at least one of an alarm notification task, a vibration-related data storage task, a diagnostic task, and/or a remote vibration-related data communication task, using the vibration activity measurement.